Original
DOC

JUL 10 1992

Docket Nos. 50-390, 50-391
License Nos. CPPR-91, CPPR-92

Tennessee Valley Authority
ATTN: Mr. M. O. Medford, Vice President
Nuclear Assurance, Licensing & Fuels
3B Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Gentlemen:

SUBJECT: SUMMARY OF MAY 28, 1992 TVA/NRC MEETING ON WATTS BAR

This letter refers to the meeting held on May 28, 1992, at the Region II office in Atlanta, Georgia. The purpose of the meeting was to discuss engineering records that have been generated to support the analysis to Cable Trays and Tray Supports, HVAC Duct and Duct Supports, and Conduits and Conduit Supports. A list of attendees and a copy of your handout are enclosed.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and its enclosures will be placed in NRC Public Document Room.

Should you have any questions concerning this matter, please contact us.

Sincerely,
Original Signed by
Bruce A. Wilson for JRJ

Jon R. Johnson, Acting Director
Division of Reactor Projects

Enclosures:
1. List of Attendees
2. Handout

cc w/encls: (See page 2)

IE45
1/1
IA3

cc w/encls:
Mr. J. B. Waters, Director
Tennessee Valley Authority
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Knoxville, TN 37902

M. J. Burzynski, Manager
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D. Nunn, Vice President
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General Counsel
Tennessee Valley Authority
400 West Summit Hill Drive
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The Honorable Robert Aikman
County Executive
Rhea County Courthouse
Dayton, TN 37321

The Honorable Johnny Powell
County Executive
Meigs County Courthouse
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Mr. Michael H. Mobley, Director
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Licensing Manager
Watts Bar Nuclear Plant
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State of Tennessee

bcc: (See page 3)

bcc w/encls:
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B. Bordenick, OGC
J. B. Brady, DRP/RII
M. S. Callahan, GPA/CA
R. D. Gibbs, DRP/RII
F. J. Hebdon, NRR
G. C. Lainas, NRR
H. H. Livermore, DRP/RII
P. S. Tam, NRR
J. F. Wechselberger, EDO
NRR Document Control Desk

NRC Resident Inspector
U. S. Nuclear Regulatory Commission
Route 2, Box 700
Spring City, TN 37381

I:DRP	RII:DRP	DRP/RII
KBarr	BWilson	JJohnson
8/7/92	8/10/92	8/10/92

ENCLOSURE 1

LIST OF ATTENDEES
May 28, 1992

Name	Title
NRC Staff	
L. Reyes	Director, Division of Reactor Projects (DRP), Region II (II)
B. Wilson	Branch Chief, DRP, RII
C. Julian	Branch Chief, RII
T. Chan	Section Chief, Office of Nuclear Reactor Regulation (NRR)
K. Barr	Section Chief, RII
J. Fair	Senior Mechanical Engineer, NRR
R. Gibbs	Project Engineer, RII
J. Wechselberger	Office of Executive Director for Operations
TVA Staff	
W. Museler	Site Vice President, Watts Bar (WB)
W. Elliott	Engineering Manager, WB
G. Pannell	Licensing Manager, WB
R. Hernandez	Project Engineer, WB
W. Massie	Licensing Engineer, WB

ENCLOSURE 2

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

Objectives

- Describe implementation of walkthrough attributes
- Explain basis of approach
- Describe correlation of engineering records to plant configuration
- Future modification process

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

INITIAL DESIGN AND CONSTRUCTION PROCESS

	CONDUIT	HVAC	CABLE TRAY
DESIGN	Typical Design Supports	Typical Design Supports	Uniquely Designed Supports
CONSTRUCTION	Field Routed	Engineering Routed	Engineering Routed
APPROXIMATE POPULATION OF SUPPORTS	45,000 Supports	2,800 Supports	4,700 Supports

Watts Bar Nuclear Plant

Conduit, HVAC, & Cable Tray CAP Implementation

Generic CAP Process

- Perform walkthrough based on visual observations and judgments
- Select critical cases for evaluation
- Evaluate critical cases
- Address problem attributes for the total population

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

CORRECTIVE ACTION PROGRAM

	Conduit	HVAC	Cable Tray
Conservatism in initial design relative to typicals	High	Low	Designed to Applied Loads
Relative Loading	Low	Medium	High
Field Variations from Design Output	High	High	Low
Changes in Design Basis	Medium	High	Low
CAP Implementation	"Initial Review"	"Initial Review"	"Initial Review"
	• Focused application of attributes based on initial CCEvaluation for conduit and supports	• Broad application of attributes to both duct and supports based on initial CCEvaluation	• Broad application of attributes for trays • Focused attributes for supports based on initial evaluations

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

Cable Trays and Supports

Cable Trays and Supports

Approach for Cable Trays - Critical Case Evaluations based on walkthrough of the population

Cable Tray Implementation

- Criteria & Design Basis developed
- Initial Critical Case Evaluation showed significant problems and potential modifications
- Walkthrough implemented for 100% of population.

Watts Bar Nuclear Plant

Cable Tray Walkthroughs

	Initial TI-2004	100% Walkthrough WD-24
Cable Tray Size	✓	✓ (WP-46)
Tray Spans	✓	✓
Tray Offset	✓	✓
Concentrated Weights	✓	✓
Tray Fitting Support	✓	✓
Tray Fitting Configuration	✓	✓
Tray Connector Bolt Size, Number of Bolts, & Bolt Configuration	✓	✓
Size of Connector	✓	✓
Location of Connector	✓	✓
Riser Cable Grip Installation	✓	✓ (TI-94.04)
Dropout Loads	✓	✓
Evaluation of Outliers	✓	✓

Cable Trays & Supports

- Approach for Cable Tray Supports

  - Resolution of NCR 5737 Revision 1

    - Sample of 58 supports for which reinspection documents exist. (3000 Supports)

    - Critical Case Evaluation of supports for which reinspection documentation is not available. (1700 Supts.)

Watts Bar Nuclear Plant

Cable Tray Support Walkthroughs

Sample Overinspection (3000 Supports)

Critical Case Evaluation (1700 Supports)

58 Supports

Support Configuration & Attachment Compatibility with Design Output Drawings

Approx. 400 Supports

Conclusion:
- NCR 5737 corrective actions resulted in revisions to drawings and field modifications.
- Supports evaluated under the CAP met design criteria requirements.

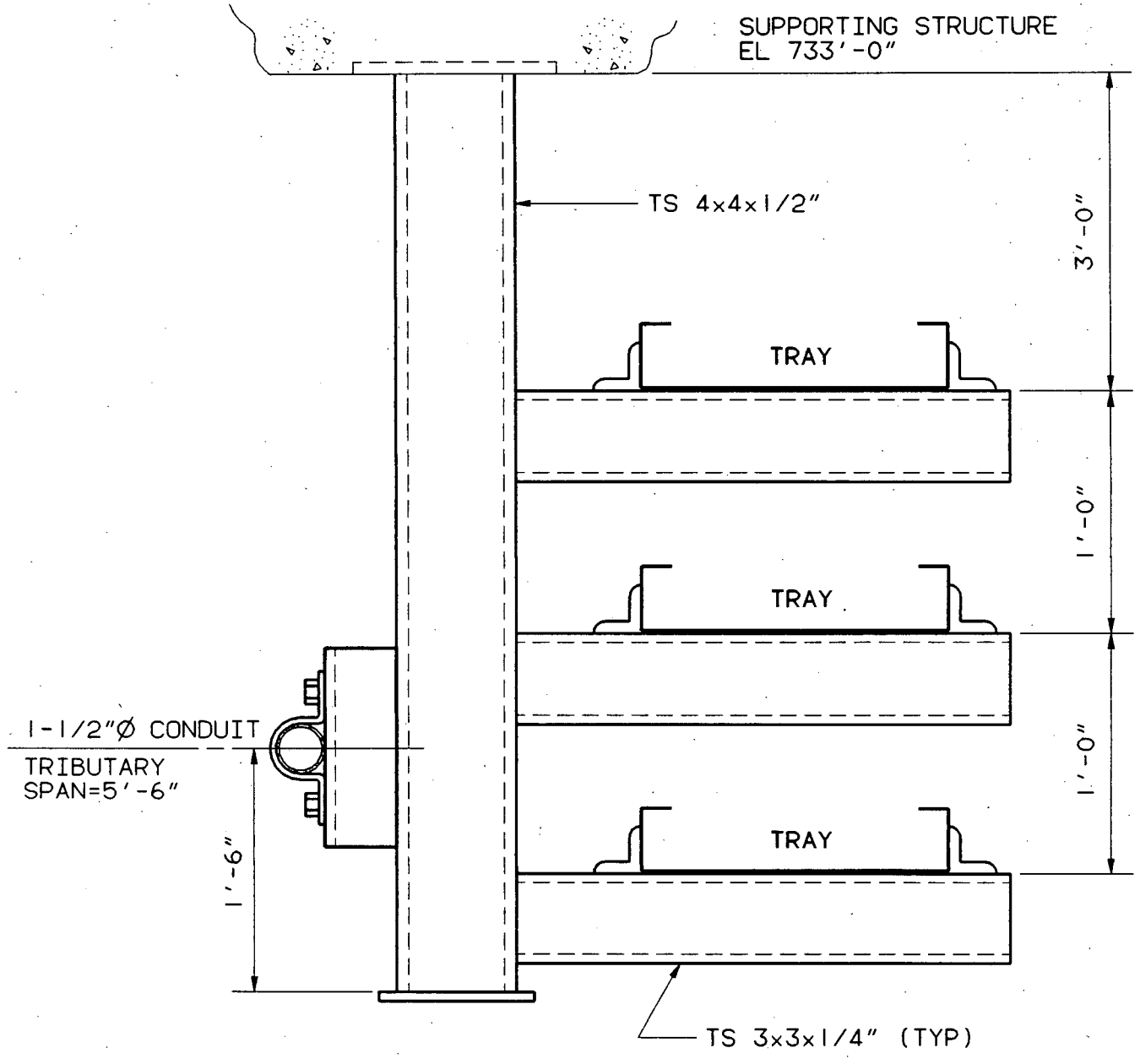
The following areas with the greatest potential to affect design adequacy were identified based on the walkthroughs.

- Unauthorized Attachments
- Tray to Support Connections
- Isolated Cases of Significant Configuration Differences

Walkthrough of Total Population (4700 Supports)

Walkthrough of Bounding Cases for Support to Structure Attachments (740 Supports)

CABLE TRAY SUPPORTS



WBN CADAM MIS703/9 GWJ

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

HVAC Duct & Supports

WAM May 28, 1992

HVAC & Duct Supports

Duct Support Evolution

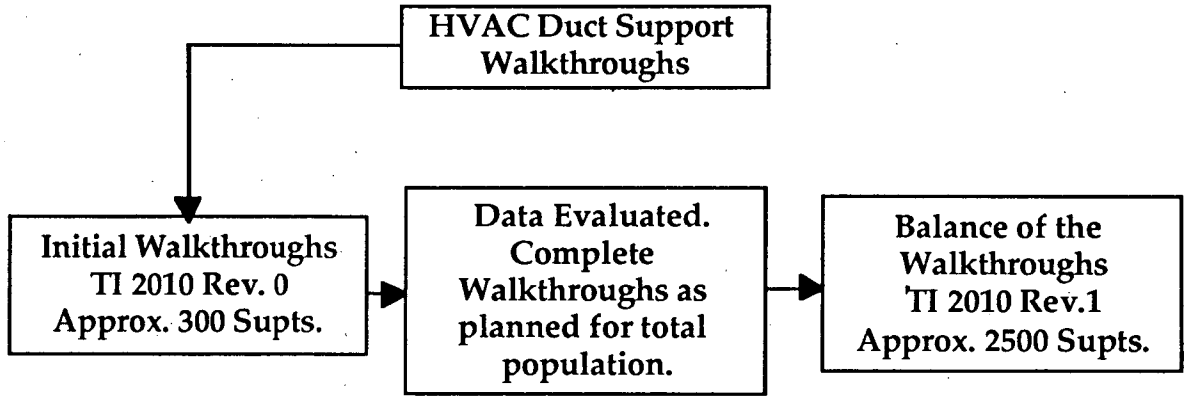
- Initial Critical Case Evaluation identified significant problems & potential modifications
- Walkthrough Procedures enhanced & applied to balance of population
- Walkthrough attributes and documentation are consistent for the initial/subsequent walkthroughs.

HVAC Duct & Duct Supports

HVAC Duct

- Initial Critical Case Evaluation identified generic modifications
- Subsequent analyses established acceptance criteria
- 100% Walkthrough to identify/correct deviations from acceptance criteria

Watts Bar Nuclear Plant

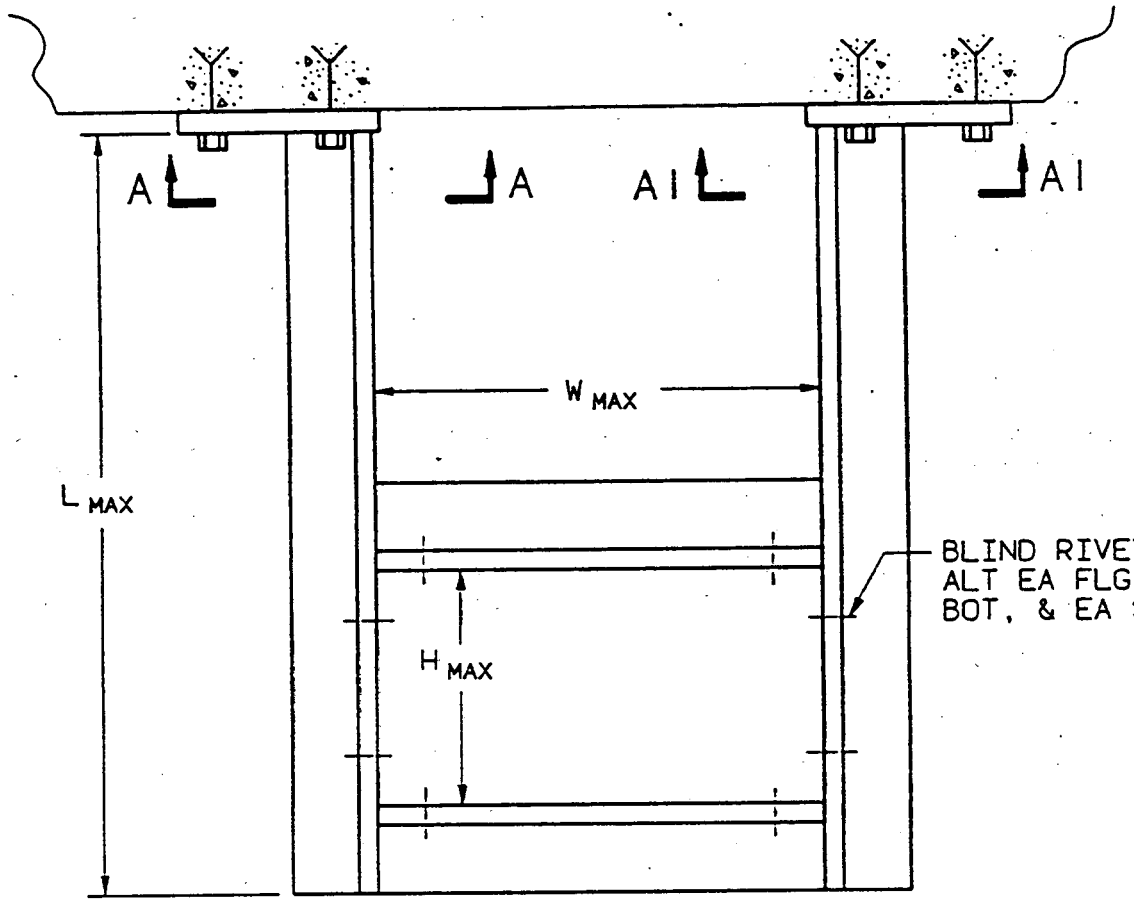


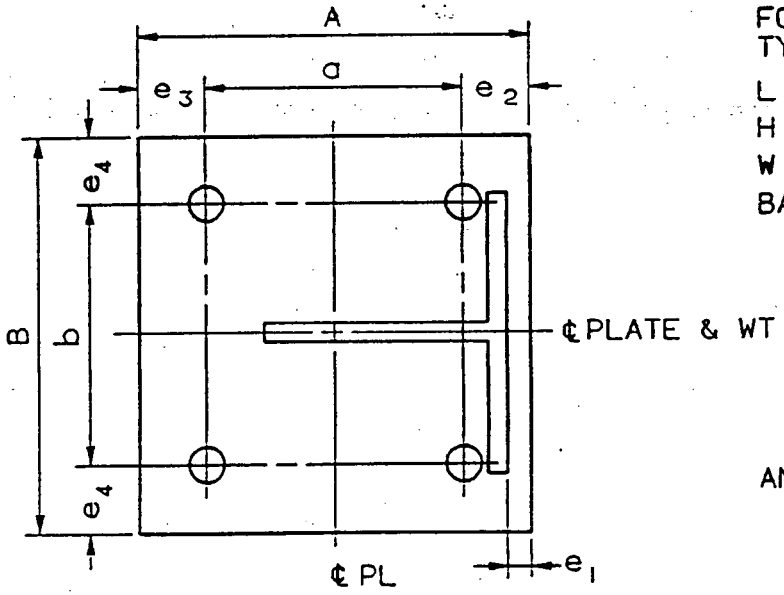
Walkdown Attributes

✓	General	✓
✓	Support Type	✓
✓	Configuration	✓
✓	Anchorage and Baseplate	✓
✓	Anchorage Adjacent to Support	Critical Cases Only
✓	Bracing	✓
✓	Interference of Bracing & Duct Stiffeners	✓
✓	Member Type & Size	✓
✓	Rod Length & Diameter	✓
✓	Non HVAC Attachments to Supts.	✓

Walkthrough of Critical Cases using TI 2012

REPRESENTATIVE HVAC TYPICAL SUPPORT





SECT A-A (AS SHOWN)
SECT A1-A1 (OPP HAND)

FOR EXAMPLE
TYPICAL 47A055-160:

L_{MAX} = 6'-6"
H_{MAX} = 4'-0"
W_{MAX} = 6'-10"
BASEPLATE: A = 10"
B = 10"
t = 3/4"
e_1 = 1/2"
e_2 = 2-1/2"
e_3 = e_4 = 1-1/2"
a = 6"
b = 7"
ANCHORS: 3/4"Ø SSDs

MBN CADAM MIS7033/8 GHJ

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

Conduit & Conduit Supports

Conduit & Conduit Support Walkthroughs

Additional Walkthroughs beyond the scope of WP-51 & TI-2006

Special Areas TI-2011
(As-Built Information)

	Approx.
• Steel containment vessel	1000 Supts.
• Yard conduit	200 Supts.
• Overweight conduit	200 Supts.
• Thermally restrained	700 Supts.

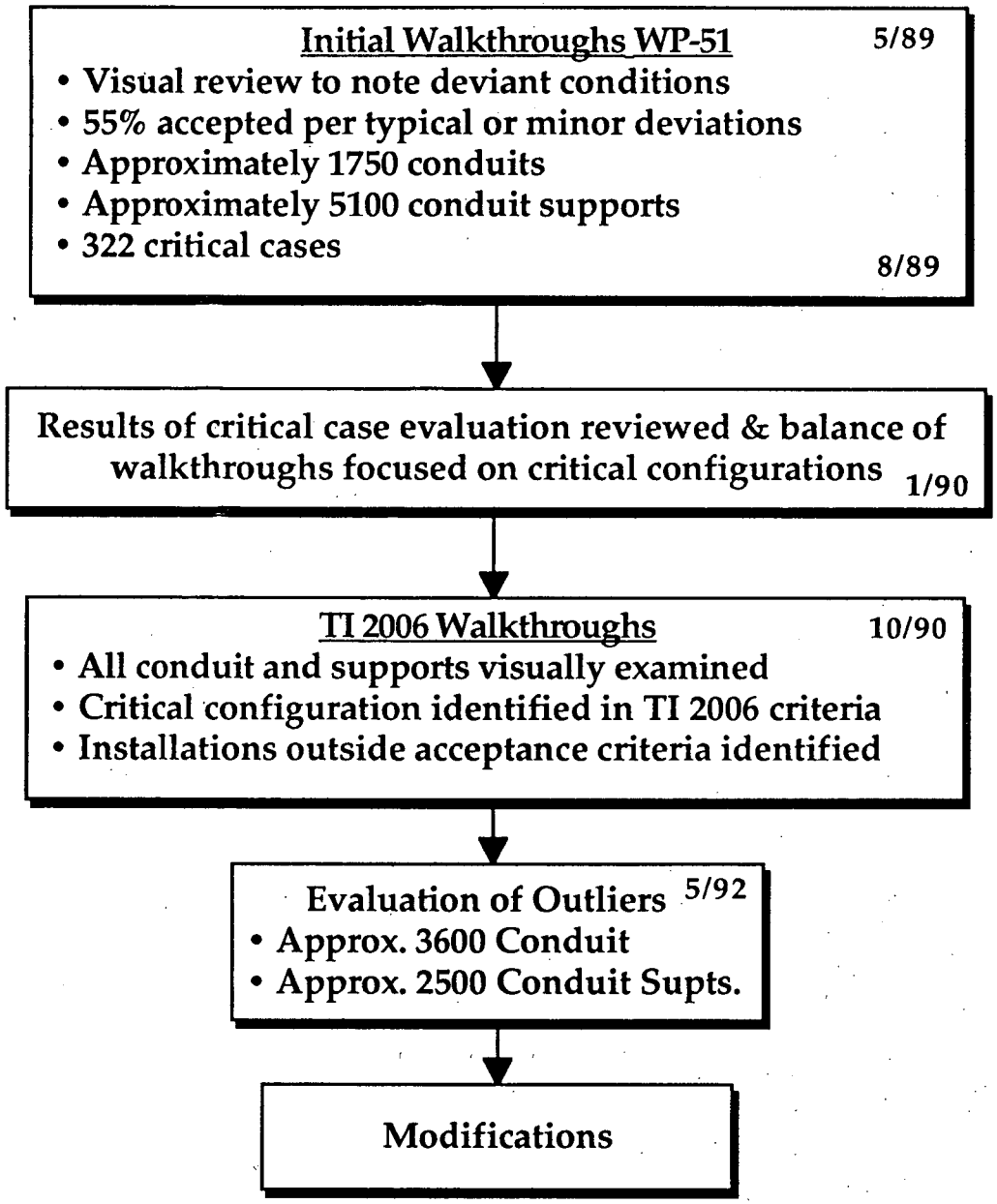
Other Areas Reviewed

- Xmas Tree configurations
- Shakespace evaluations

Modification Walkdowns
(Identify & Correct)

- One hole straps
- Clamp type
- Unistrut spring nut orientation
- Damaged, loose & missing

Conduit & Conduit Support Walkthroughs



WATTS BAR NUCLEAR PLANT

Critical Conduit & Support Configurations	Overspan	L Shape	Xmas Trees	107/52	Unique Conduit	Unique Support	Typical 55	Typical 66A/B	Missing Brace

TI-2006 Configurations Where Attributes are Focused

Conduit Attributes
Single
Overspan
Free Ends
Offsets
Conc. Wts.
Span to JB
Axial Supt.
Shakespace

Support Attributes
Anchor Bolts
Weld Config.
Base Plate
Member Size & Config.
Spring Nut
Conduit Type/No.
Conduit Location
Orientation
Insulation
Clamp
Junction Box

WP-51 Attributes

WAM 5/28/92

Watts Bar Nuclear Plant
Conduit & Conduit Support Walkthrough

SCOPE	INITIAL	BALANCE OF WALKTHROUGHS - TI 2006				
Configuration & Size / Attribute	All Configurations	Spans	L-SHAPE Cantilever	Xmas Trees	Typicals 107/52	Unique Conditions
	1/2" – 5"	1/2" – 2"	1/2" – 5"	1/2" – 5"	1/2" – 5"	1/2" – 5"
Single Support	✓	All single supports were identified as unique.				✓
Overspans	✓	✓	✓	NA	✓	✓
Free End	✓	NA	✓	✓	NA	✓
Offsets	✓	✓	NA	NA	NA	✓
Concentrated Weight	✓	✓	✓	✓	NA	✓
Span to Junction Boxes	✓	✓	NA	NA	NA	✓
Axial Supports	✓	All supports provide axial restraint.				
Shakespace	✓	100% Coverage by special program.				

SCOPE	INITIAL WP-51	BALANCE OF WALKTHROUGH TI 2006			
Supports / Attributes	All	Unique Supports All	Typical (55)	Typical (66A/B)	Other Typicals All
Anchor Bolts	✓	✓	✓	✓	
Weld Config.	✓	✓		✓	
Baseplate	✓	✓	✓	✓	
Member Size, Configuration	✓	✓	✓	✓	✓ (Missing Members)
Spring Nut	✓	100% Modifications Walkdown			
Conduit Type, No.	✓	✓	✓	✓	
Conduit Location	✓	✓	✓	✓	
Orientation	✓	✓	✓	✓	✓
Insulation	✓	✓	✓	✓	
Clamp	✓	100% Modifications Walkdown			
Junction Box	✓	✓	NA	NA	NA

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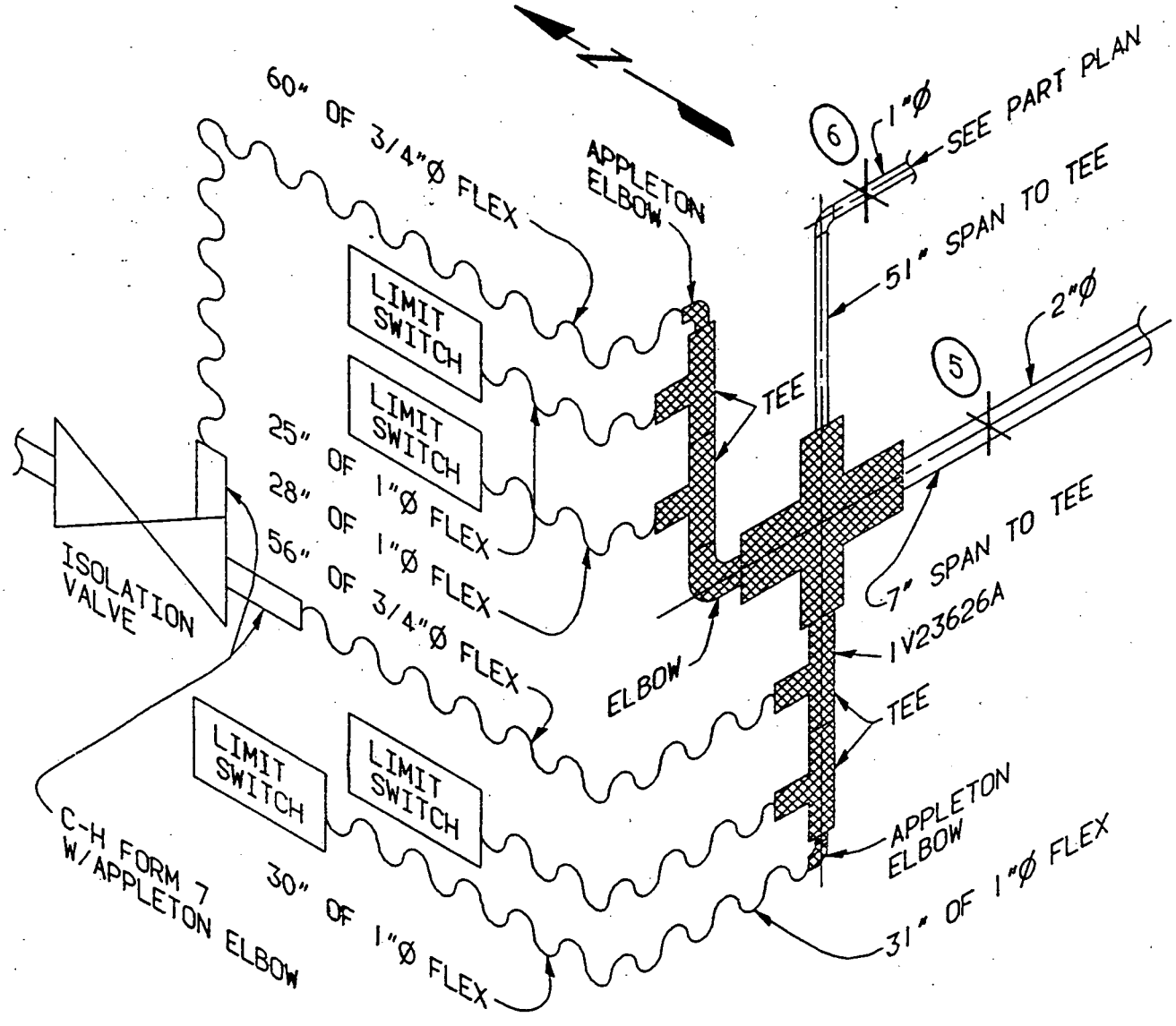
Watts Bar Nuclear Plant

CONDUIT WALKTHROUGH

SCOPE	INITIAL	BALANCE OF WALKTHROUGHS - TI 2006				
Configuration & Size / Attribute	All Configurations	Spans	L-SHAPE Cantilever	Xmas Trees	Typicals 107/52	Unique Conditions
	1/2" – 5"	1/2" – 2"	1/2" – 5"	1/2" – 5"	1/2" – 5"	1/2" – 5"
SINGLE SUPPORT	✓	All single supports were identified as unique.				✓
OVERSPANS	✓	✓	✓	NA	✓	✓
FREE END	✓	NA	✓	✓	NA	✓
OFFSETS	✓	✓	NA	NA	NA	✓
CONCENTRATED WEIGHT	✓	✓	✓	✓	NA	✓
SPAN to JUNCTION BOXES	✓	✓	NA	NA	NA	✓
AXIAL SUPTS.	✓	All supports provide axial restraint.				
SHAKESPACE	✓	100% Coverage by special program.				

CONDUIT
(CHRISTMAS TREE)



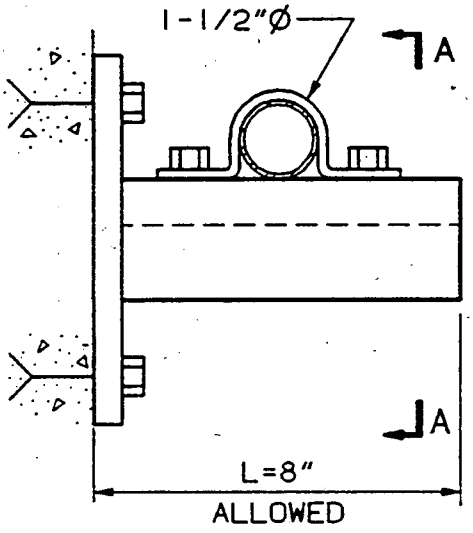
Watts Bar Nuclear Plant

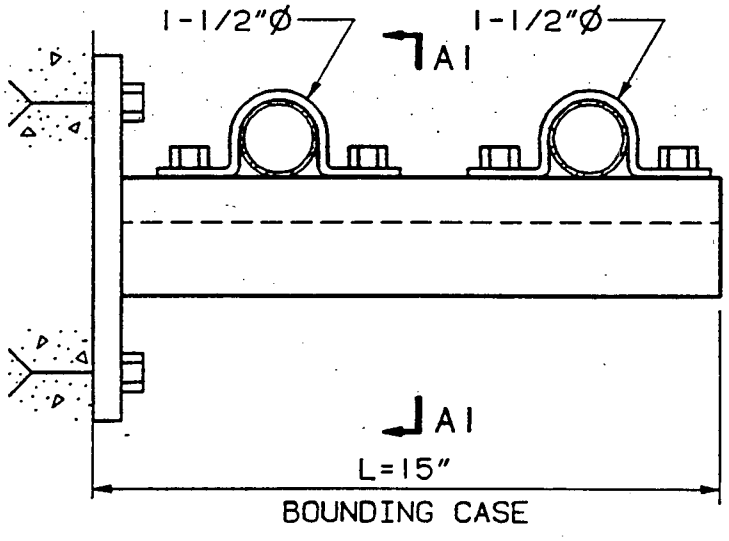
CONDUIT SUPPORTS WALKTHROUGH

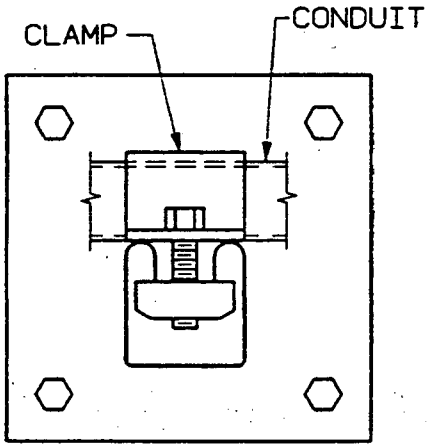
SCOPE	INITIAL WP-51	BALANCE OF WALKTHROUGH TI 2006			
Supports / Attributes	All	Unique Supports All *	Typical (55)	Typical (66A/B)	Other Typicals All *
Anchor Bolts	✓	✓	✓	✓	
Weld Config.	✓	✓		✓	
Baseplate	✓	✓	✓	✓	
Member Size, Configuration	✓	✓	✓	✓	✓ (Missing Members)
Spring Nut Orientation	✓	100% Modifications Walkdown			
Conduit Type, No.	✓	✓	✓	✓	
Conduit Location	✓	✓	✓	✓	
Orientation	✓	✓	✓	✓	✓
Insulation	✓	✓	✓	✓	
Clamp	✓	100% Modifications Walkdown			
Junction Box	✓	✓	NA	NA	NA

* Required visual examination of all supports to establish support type, determination of uniqueness and missing members.

CONDUIT TYPICAL 66
(CANTILEVERED UNISTRUT)







A-A &
A1-A1

WBN CADAM MIS703/5 GWJ

Watts Bar Nuclear Plant

Summary of Results

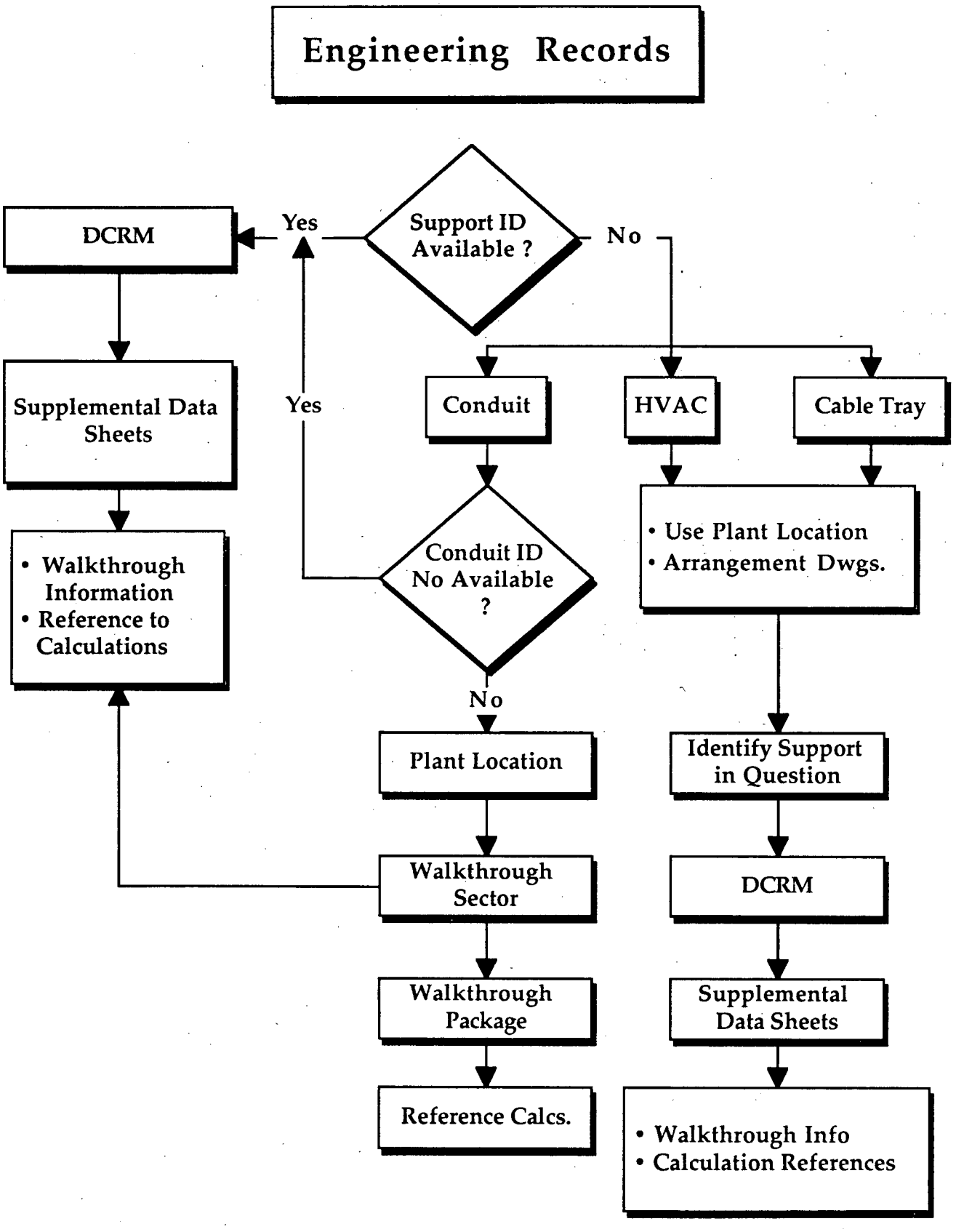
Aspect	Conduit	HVAC	Cable Tray
Projected Support Mod Rate	1-5%	20-25%	10-15%
Support Capability to Resist Load	High	Low	Medium
Highest Contributor to need for Modifications	Variances to Typicals	• Design Basis Upgrade • Variances to Typicals	Unauthorized Attachments to Supts.
Projected Rate of Future Load Additions	Minimal	Minimal	Low

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

Engineering Records Retrieval

- Records cross referenced to supports
  - Unique Calculations
  - Critical Case Calculations
  - Walkthrough Packages
- Products resulting from CAP implementation captured in one reference
- Procedurally controlled (EAI 8.03) for future usage

WATTS BAR NUCLEAR PLANT



WAM May 28, 1992

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

Future Modifications

- Design Change Process Controlled - EAI 3.05
- Utilize CAP developed engineering information
- Process requires gathering of as-built information to ensure workable and adequate designs.
- Engineering Records Procedure EAI 8.03 cross-referenced to EAI 3.05

Watts Bar Nuclear Plant
Conduit, HVAC, & Cable Tray
CAP Implementation

Summary

- CAP Implementation assures structural adequacy of in-plant configuration to meet design requirements.
- Engineering validation records are cross referenced and retrievable.
- Future modification requires the use of:
  - engineering material developed for the CAP
  - as-built information
- Design changes and changes to plant configuration are controlled.